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Test 943: Oliver 1550 Diesel

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NEBRASKA TRACTOR TEST 943 – OLIVER 1550 DIESEL
(ALSO MINNEAPOLIS-MOLINE G550 DIESEL)
ALSO OLIVER 1555 DIESEL

POWER TAKE-OFF PERFORMANCE

Hp	Crankshaft speed rpm	Fuel Consumption: Gal per hr	Fuel Consumption: Lb per hp-hr	Fuel Consumption: Hp-hr per gal	Temperature Degrees F: Cooling medium	Temperature Degrees F: Air wet bulb	Temperature Degrees F: Air dry bulb	Barometer inches of Mercury
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours								
53.50	2200	4.331	0.565	12.35	172	64	75	29.010
VARYING POWER AND FUEL CONSUMPTION—TWO HOURS								
48.07	2327	3.990	0.580	12.05	168	64	75	... .
0.00	2405	1.581	. .....	.....	159	63	74	... .
24.42	2364	2.732	0.781	8.94	162	63	75	.....
53.38	2202	4.329	0.567	12.33	174	64	76	.. ..
12.30	2383	2.173	1.234	5.66	160	64	75	.....
36.31	2344	3.329	0.640	10.91	166	64	75	.....
Av 29.08	2337	3.022	0.726	9.62	165	64	75	28.990

DRAWBAR PERFORMANCE

Hp	Drawbar pull lbs	Speed miles per hr	Crankshaft speed rpm	Slip of drivers %	Fuel Consumption: Gal per hr	Fuel Consumption: Lb per hp-hr	Fuel Consumption: Hp-hr per gal	Temp Degrees F: Cooling med	Temp Degrees F: Air wet bulb	Temp Degrees F: Air dry bulb	Barometer inches of Mercury
VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST											
Maximum Available Power—Two Hours—4th Gear Hydra-Power											
45.72	3800	4.51	2201	5.57	4.384	0.670	10.43	175	64	77	29.070
75% of Pull at Maximum Power—Ten Hours—4th Gear Hydra-Power											
36.88	2848	4.86	2331	4.10	3.650	0.691	10.10	175	71	81	28.615
50% of Pull at Maximum Power—Two Hours—4th Gear Hydra-Power											
26.47	1990	4.99	2369	3.07	3.037	0.801	8.72	170	64	74	29.075
MAXIMUM POWER WITH BALLAST											
42.03	6636	2.38	2206	14.84	2nd Gear Hydra-Power			175	65	77	28.850
44.91	5540	3.04	2196	9.52	3rd Gear Hydra-Power			176	65	77	28.850
43.85	4713	3.49	2194	7.62	2nd Gear			176	65	77	28.850
44.39	3866	4.31	2199	5.97	3rd Gear			178	64	76	28.830
45.77	3821	4.49	2197	5.84	4th Gear Hydra-Power			178	64	76	28.830
45.53	3044	5.61	2200	4.54	5th Gear Hydra-Power			178	64	76	28.830
44.98	2701	6.24	2201	4.05	4th Gear			179	64	76	28.830
43.98	2129	7.75	2202	3.21	5th Gear			176	65	75	28.820
44.19	1690	9.80	2198	2.71	6th Gear Hydra-Power			176	65	75	28.820
40.85	1131	13.54	2205	1.84	6th Gear			176	65	75	28.820
MAXIMUM POWER WITHOUT BALLAST											
45.90	3845	4.48	2201	6.45	4th Gear Hydra-Power			175	68	81	28.910

VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST
4th Gear Hydra-Power

Pounds pull	3821	4193	4429	4648	4497	4418
Horsepower	45.77	44.99	41.94	38.38	31.82	26.04
Crankshaft speed, rpm	2197	1982	1758	1541	1317	1095
Miles per hour	4.49	4.02	3.55	3.10	2.65	2.21
Slip of drivers, %	5.84	6.44	6.97	7.49	7.23	6.97

TIRES, BALLAST and WEIGHT		With Ballast	Without Ballast
Rear tires	—No, size, ply & psi	Two 15.5-38; 6; 16	Two 15.5-38; 6; 14
Ballast	—Liquid	698 lb each	None
	Cast iron	140 lb each	None
Front tires	—No, size, ply & psi	Two 6.00-16; 4; 32	Two 6.00-16; 4; 32
Ballast	—Liquid	None	None
	Cast iron	None	None
Height of drawbar		19½ inches	19½ inches
Static weight with operator—Rear		6780 lb	5105 lb
	Front	1950 lb	1915 lb
	Total	8730 lb	7020 lb

Department of Agricultural Engineering
Dates of Test: JUNE 8 to JUNE 15, 1966
Manufacturer: OLIVER CORPORATION, CHARLES CITY, IOWA

FUEL, OIL and TIME Fuel No 2 diesel Cetane No 57.0 (rating taken from oil company's typical inspection data) Specific gravity converted to 60°/60° 0.8388 Weight per gallon 6.985 lb Oil SAE 10W API service classification MS, DS To motor 1.694 gal Drained from motor 1.175 gal Transmission and final-drive lubricant SAE 80 multi-purpose Total time engine was operated 41½ hours.

ENGINE Make Oliver diesel Type 6 cylinder vertical Serial No 103623 Crankshaft mounted lengthwise Rated rpm 2200 Bore and stroke 3⅜" x 3¾" Compression ratio 16.5 to 1 Displacement 232 cu in Cranking system 12 volt electric (two 6-volt batteries) Lubrication pressure Air cleaner dry type with built-in precleaner and automatic dust unloader using replaceable paper element Oil filter full flow replaceable pleated paper cartridge Oil cooler engine coolant heat exchanger for transmission oil and radiator for hydraulic oil Fuel filter primary filter with replaceable cotton element and final filter with replaceable pleated paper element Muffler was used Cooling medium temperature control thermostat.

CHASSIS Type Tricycle Serial No 165753-504 Tread width rear 55" to 90⅞" front 7½" or 13¼" Wheel base 99¼" Center of gravity (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 28.1" Vertical distance above roadway 31.6" Horizontal distance from center of rear wheel tread 0" to the right/left Hydraulic control system direct engine drive Transmission selective gear fixed ratio with partial range operator controlled power shifting Advertised speeds mph first 2.63 second 3.73 third 4.52 fourth 6.42 fifth 7.89 sixth 13.57 reverse 2.95 and 5.07 (using Hydra-Power drive) first 1.93 second 2.74 third 3.32 fourth 4.71 fifth 5.79 sixth 9.96 reverse 2.16 and 3.72 Clutch single plate dry disc operated by foot pedal Brakes multiple disc operated by two foot pedals which can be locked together Steering hydraulic with power assist Turning radius (on concrete surface with brake applied) right 146" left 146" (on concrete surface without brake) right 166" left 166" Turning space diameter (on concrete surface with brake applied) right 300" left 300" (on concrete surface without brake) right 340" left 340" Belt pulley 1035 rpm at 2200 engine rpm diam 11$^{7}/_{16}$" face 8" Belt speed 3106 fpm Power take-off 550 or 994 rpm at 2200 engine rpm.

REPAIRS and ADJUSTMENTS No repairs or adjustments.

REMARKS All test results were determined from observed data obtained in accordance with the SAE and ASAE test code.

First gear Hydra-Power drive and first gear direct drive were not run as it was necessary to limit the pull in second gear Hydra-Power drive to avoid excessive wheel slippage.

We, the undersigned, certify that this is a true and correct report of official Tractor Test 943.

L. F. LARSEN
Engineer-in-Charge
G. W. STEINBRUEGGE, Chairman
J. J. SULEK
D. E. LANE
Board of Tractor Test Engineers

The University of Nebraska Agricultural Experiment Station
E. F. Frolik, Dean; H. H. Kramer, Director, Lincoln, Nebraska

EXPLANATION OF TEST REPORT

GENERAL CONDITIONS

Each tractor is a production model equipped for common usage. Power consuming accessories can be disconnected only when it is convenient for the operator to do so in practice. Additional weight can be added as ballast if the manufacturer regularly supplies it for sale. The static tire loads and the inflation pressures must conform to recommendations in the Tire Standards published by the Society of Automotive Engineers.

PREPARATION FOR PERFORMANCE RUNS

The engine crankcase is drained and refilled with a measured amount of new oil conforming to specifications in the operators manual. The fuel used and the maintenance operations must also conform to the published information delivered with the tractor. The tractor is then limbered-up for 12 hours on drawbar work in accordance with the manufacturer's published recommendations. The manufacturer's representative is present to make appropriate decisions regarding mechanical adjustments.

The tractor is equipped with approximately the amount of added ballast that is used during maximum drawbar tests. The tire tread-bar height must be at least 65% of new tread height prior to the maximum power run.

BELT OR POWER TAKE-OFF PERFORMANCE

Maximum Power and Fuel Consumption. The manufacturer's representative makes carburetor, fuel pump, ignition and governor control settings which remain unchanged throughout all subsequent runs. The governor and the manually operated governor control lever is set to provide the high-idle speed specified by the manufacturer for maximum power. Maximum power is measured by connecting the belt pulley or the power take-off to a dynamometer. The dynamometer load is then gradually increased until the engine is operating at the rated speed specified by the manufacturer for maximum power. The corresponding fuel consumption is measured.

Varying Power and Fuel Consumption. Six different horsepower levels are used to show corresponding fuel consumption rates and how the governor causes the engine to react to the following changes in dynamometer load: 85% of the dynamometer torque at maximum power; minimum dynamometer torque, ½ of the 85% torque; maximum power, ¼ and ¾ of the 85% torque. Since a tractor is generally subjected to varying loads the average of the results in this test serve well for predicting the fuel consumption of a tractor in general usage.

DRAWBAR PERFORMANCE

All engine adjustments are the same as those used in the belt or power take-off tests. If the manufacturer specifies a different rated crankshaft speed for drawbar operations, then the position of the manually operated governor control is changed to provide the high-idle speed specified by the manufacturer in the operating instructions.

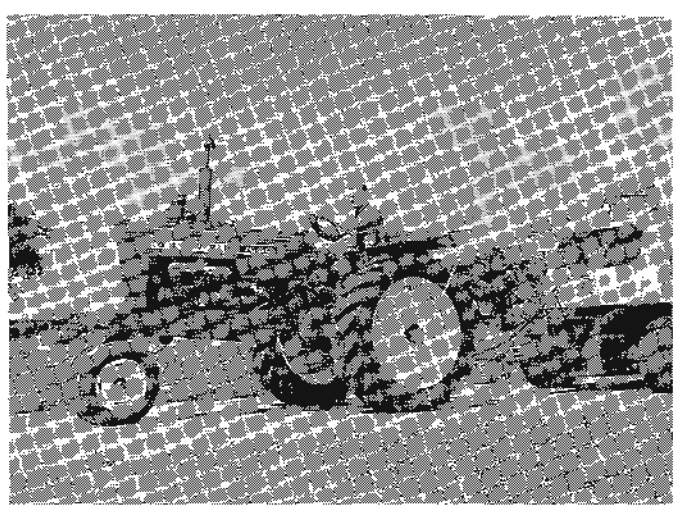
Varying Power and Fuel Consumption With Ballast. The varying power runs are made to show the effect of speed-control devices (engine, governor, automatic transmission, etc.) on horsepower, speed and fuel consumption. These runs are made around the entire test course which has two 180 degree turns with a minimum radius of 50 feet. The drawbar pull is set at 3 different levels as follows: (1) as near to the pull at maximum power as possible and still have the tractor maintain the travel speed at maximum horsepower on the straight sections of the test course; (2) 75% of the pull at maximum power; and (3) 50% of the pull at maximum power. Prior to 1958, fuel consumption data (10 hour test) were shown only for the pull obtained at maximum power for tractors having torque converters and at 75% of the pull obtained at maximum power for gear-type tractors.

Maximum Power with Ballast. Maximum power is measured on straight level sections of the test course. Data are shown for not more than 12 different gears or travel speeds. Some gears or travel speeds may be omitted because of high slippage of the traction members or because the travel speed may exceed the safe-limit for the test course. The maximum safe speed for the Nebraska Test Course has been set at 15 miles per hour. The slippage limits have been set at 15% and 7% for pneumatic tires and steel tracks or lugs, respectively. Higher slippage gives widely varying results.

Maximum Power Without Ballast. All added ballast is removed from the tractor. The maximum drawbar power of the tractor is determined by the same procedure used for getting maximum power with ballast. The gear (or travel speed) is the same as that used in the 10-hour test.

Varying Power and Travel Speed with Ballast. Travel speeds corresponding to drawbar pulls beyond the maximum power range are obtained to show the "lugging ability" of the tractor. The run starts with the pull at maximum power; then additional drawbar pull is applied to cause decreasing speeds. The run is ended by one of three conditions: (1) maximum pull is obtained, (2) the maximum slippage limit is reached, or (3) some other operating limit is reached.

For additional information about the **Nebraska Tractor Tests** write to the **Department of Agricultural Engineering, University of Nebraska, Lincoln, Nebraska.**



Oliver 1550 Diesel